AMENDMENTS TO THE CLAIMS

1.   (Currently amended)   An apparatus for performing multistage processing with feedback, comprising:

a first plurality of processing stages connected in series and having a feedback channel connecting a last stage of the first plurality to one of the processing stages among the first plurality of processing stages, wherein each processing stage of the first plurality is configured to process one block of data from a data stream during one processing cycle; and

a parallel input queue comprising a second plurality of input queues connected in parallel to the first stage wherein each of the input queues has an output coupled to the first stage and each of the input queues has an input coupled to a different data stream among a third plurality of data streams, and configured to direct a data block to the first stage alternately from each of a-the third plurality of data streams.

2.   (Original)   An apparatus as recited in Claim 1, wherein the number of input queues in the second plurality is no greater than a number of processing stages in the first plurality.

3.   (Original)   An apparatus as recited in Claim 1, wherein

a block on the feedback channel based on an input block on a particular data stream is combined with a later block of the particular data stream that is a delay number of blocks after the input block; and

a number of input queues in the second plurality is based on the delay number and a number of processing stages in the first plurality.

4.   (Original)   An apparatus as recited in Claim 1, further comprising a parallel context array comprising a second plurality of context registers connected in parallel to the first stage, for directing context information from a context register to the first stage during a processing cycle with an associated data stream on a corresponding input queue.

5.   (Currently amended)   An apparatus as recited in Claim 4, wherein the first plurality of processing stages implement an encryption process and the context information associated with the data stream comprises an encryption key for the data stream~.

6.   (Original)   An apparatus as recited in Claim 3, wherein the feedback channel comprises a set of one or more feedback hold registers for synchronizing the block on the feedback channel to be directed to the first stage during a processing cycle when the later block is directed to the first stage.

7.   (Original)   An apparatus as recited in Claim 1, further comprising a parallel output queue comprising a second plurality of output queues connected in parallel to the last stage, for directing a block from the last stage alternately to each of a third plurality of output streams, each output stream corresponding to a respective data stream of the third plurality of data streams.

8.   (Currently amended)   A method of performing multistage processing with feedback, the method comprising the step of directing alternately to a first processing stage of a first plurality of processing stages connected in series, a second plurality of data streams, wherein:

the second plurality of data streams is queued in a third plurality of parallel input queues each having an input coupled to a different one of the data streams and having an output coupled in parallel to the first processing stage;

one data block from one data stream can be processed at one processing stage during one processing cycle;

each interior input block of each data stream is not directed to the first processing stage before an output block based on a previous input data block from the data stream is output from the first plurality of processing stages;

the previous input data block precedes the interior input block in the data stream by a delay number of blocks less than a number of processing stages in the first plurality; and

the interior block follows the delay number of blocks counting from a beginning of the data stream.

9.   (Original)   A method as recited in Claim 8, wherein a number of data streams in the second plurality is equal to the number of processing stages in the first plurality.

10.   (Original)   A method as recited in Claim 8, wherein a number of data streams in the second plurality is based on the number of processing stages and the delay number.

11.   (Original)   A method as recited in Claim 8, further comprising the step of directing to the first processing stage, with each data stream, context information associated with the data stream.

12.   (Currently amended)   A method as recited in Claim 11, wherein the first plurality of processing stages implement an encryption process and the context information is an encryption key~~;~~.

13.   (Currently amended)   A computer-readable medium carrying one or more sequences of instructions for performing multistage processing with feedback, which instructions, when executed by one or more processors, cause the one or more processors to carry out the step of
            directing alternately to a first processing stage of a first plurality of processing stages
                    connected in series, a second plurality of data streams;
        wherein
                    the second plurality of data streams is queued in a third plurality of parallel input
                            queues each having an input coupled to a different one of the data streams
                            and having an output coupled in parallel to the first processing stage;
            one data block from one data stream can be processed at one processing stage
                    during one processing cycle,
            each interior input block of each data stream is not directed to the first processing
                    stage before an output block based on a previous input data block from the
                    data stream is output from the first plurality of processing stages

the previous input data block precedes the interior input block in the data stream

by a delay number of blocks less than a number of processing stages in the

first plurality, and

the interior block follows the delay number of blocks counting from a beginning

of the data stream.

14.   (Currently amended) An apparatus for performing multistage processing with feedback,
comprising:

means for processing a data block sequentially through a first plurality of processing

stages connected in series during a corresponding number of clock cycles;

means for feeding an output block from a last stage of the first plurality back to a first

stage of the first plurality; and

means for directing a data block to the first stage alternately from each of a third plurality

of data streams on a parallel input queue comprising a second plurality of input

queues connected in parallel to the first stage, wherein each of the input queues

has an output coupled to the first stage and each of the input queues has an input

coupled to a different data stream among the third plurality of data streams.

15.-16. (Canceled)

17.   (Currently amended) An apparatus for encrypting or decrypting network messages on a
data network, comprising:

a network interface that is coupled to the data network for receiving a plurality of data

streams therefrom;

multiple processors connected in series and configured to process a data block from an

input stream during one processing cycle in one processor; and to feed an output

block from a last processor back to a first processor; and

a parallel input queue comprising a plurality of input queues connected in parallel to the

first processor for directing a data block to the first processor alternately from

each of the plurality of data streams, wherein each of the input queues has an

output coupled to the first processor and each of the input queues has an input
coupled to a different data stream among the plurality of data streams.

18.   (Original)   An apparatus as recited in Claim 17, further comprising:

a context channel connecting the multiple processors in series; and

a context buffer comprising a plurality of context registers connected in parallel to the
first processor for directing context information alternately from each of the
context registers to the first stage.

19.   (Original)   An apparatus as recited in Claim 18, wherein the context information
comprises a symmetric block cipher encryption key associated with the data block.

20.   (Original)   An apparatus as recited in Claim 18, wherein the context information
comprises one or more initial vector values associated with the data block for use as input
to a symmetric block cipher that encrypts the data block.

21.   (Currently amended)   A computer-readable medium carrying one or more sequences of
instructions for performing multistage processing with feedback, which instructions,
when executed by one or more processors, cause the one or more processors to carry out
the steps of:

creating and storing a first plurality of processing stages that are connected in series and
having a feedback channel connecting a last stage of the first plurality to one of
the processing stages among the first plurality of processing stages;

creating and storing a parallel input queue comprising a second plurality of input queues
connected in parallel to the-a first stage among the processing stages, wherein
each of the input queues has an output coupled to the first stage and each of the
input queues has an input coupled to a different data stream among a third
plurality of data streams;

processing one block of data from a data stream during one processing cycle using each
processing stage of the first plurality;

directing a data block to the first stage alternately from each of a~the third plurality of data streams.

22. (Currently amended) A computer-readable medium as recited in Claim 21, ~~wherein the instructions for creating and storing a parallel input queue comprise instructions for creating and storing a parallel input queue comprising a second plurality of input queues connected in parallel to the first processing stage,~~ wherein the number of input queues in the second plurality is no greater than a number of processing stages in the first plurality.

23. (Original) A computer-readable medium as recited in Claim 21, further comprising instructions for carrying out the steps of:
combining a block on the feedback channel based on an input block on a particular data stream with a later block of the particular data stream that is a delay number of blocks after the input block;
creating and storing a number of input queues in the second plurality that is based on the delay number and a number of processing stages in the first plurality.

24. (Original) A computer-readable medium as recited in Claim 21, further comprising instructions for carrying out the steps of:
creating and storing a parallel context array comprising a second plurality of context registers connected in parallel to the first stage;
directing context information from a context register to the first stage during a processing cycle with an associated data stream on a corresponding input queue.

25. (Original) A computer-readable medium as recited in Claim 24, further comprising instructions for carrying out the steps of:
implementing an encryption process in the first plurality of processing stages;
creating and storing an encryption key for the data stream as the context information associated with the data stream.

26.   (Original)   A computer-readable medium as recited in Claim 23, further comprising instructions for carrying out the steps of creating and storing, as part of the feedback channel, a set of one or more feedback hold registers for synchronizing the block on the feedback channel to be directed to the first stage during a processing cycle when the later block is directed to the first stage.

27.   (Original)   A computer-readable medium as recited in Claim 21, further comprising instructions for carrying out the steps of: creating and storing a parallel output queue comprising a second plurality of output queues connected in parallel to the last stage; and directing a block from the last stage alternately to each of a third plurality of output streams, each output stream corresponding to a respective data stream of the third plurality of data streams.